

REMARKS

Claims 1 and 8-17 are pending. No new matter has been added by way of the above amendments. For example, the amendments to claim 1 are supported by originally filed claims 2-7 as well as the present specification at page 2. The amendments to claims 8, 12 and 13 were made in order to correct dependency and the amendments to claims 9-11 and 14 were made in order to more clearly define the present invention. Accordingly, no new matter has been added.

In view of the following remarks, Applicant respectfully requests that the Examiner withdraw all rejections and allow the currently pending claims.

Sequence Listing

In the outstanding Office Action, the Examiner forwarded the Notice to Comply with Requirements for Patent Applications Containing Nucleotide Sequence and/or Amino Acid Sequence Disclosures. Applicant respectfully submits that these requirements were met in the submission dated April 17, 1998.

Issues Under 35 U.S.C. § 101

The Examiner has rejected claims 1-7 under 35 U.S.C. § 101 due to the fact that the claimed invention is directed to non-statutory subject matter. Applicant respectfully traverses.

Applicant respectfully submits that the preamble of pending claim 1 has been changed to "an isolated aldehyde oxidase".

Accordingly, this rejection is overcome.

Issues Under 35 U.S.C. § 112, first paragraph

In the outstanding Office Action, the Examiner has rejected claims 1-3 and 8-16 under 35 U.S.C. § 112, first paragraph, due to the fact that the specification, while being enabling for isolation of an aldehyde oxidase gene from maize (*Zea mays L.*) which are identified by sequence Nos: 1-4, does not allegedly provide enablement for the isolation of this gene from other plants and microorganisms. Applicant respectfully traverses; however, in an effort to further prosecution, Applicant has amended claim 1 so as to recite the limitation "maize (*Zea mays L.*)". Accordingly, this rejection is overcome.

The Examiner has also rejected claims 9-16 under 35 U.S.C. § 112, first paragraph, because the specification, while being enabling for production of transgenic tobacco, carrot, pea and alfalfa, does not allegedly provide enablement for obtaining transformants from any other plant species and microorganisms. Applicant respectfully traverses.

On pages 6-9 of the outstanding Office Action, the Examiner has generated comments as to why the breadth of the claims are not commensurate in scope with support for enablement set forth in the

present specification. Specifically, the Examiner has attempted to show that the present art form is highly unpredictable. Applicant respectfully submits that the Examiner is in error. In order to further clarify this assertion that the Examiner is in error, Applicant will now describe the references utilized by the Examiner in forming his rejection.

Matzke and Matzke

According to the Examiner, Matzke and Matzke disclose that silencing of transgenes by methylation, co-suppression or sense-suppression due to a genomic immune function in both plant and animal cells, may explain unpredictability of expression of a foreign gene. However, Applicant submits that this reference merely lists the presence of a certain supposed mechanism to explain unsuccessful transgenic plant production with specific examples of genes. In addition, it also discloses from the penultimate line in the left column at page 684 to the last paragraph at page 685 that "regardless of the mechanism(s) of gene silencing, it can generate heritable epigenetic variants." Thus, in the whole context of the reference, there is no support for the alleged unpredictability, particularly with respect to the presently claimed method reciting specific sequences.

Finnegan and McElroy

Finnegan et al. report examples of suppose mechanisms of unwanted silencing of transgenes for specific genes and examine means of stabilizing gene expression in transgenic plants. However, at p. 883, left column, 2nd paragraph, first 8 lines, Finnegan et al. describe that "this particular problem can be overcome by regenerating many independent transformants and screening for those with the appropriate expression characteristics." Thus, the Finnegan et al. reference actually supports Applicant's claim. See also, In re Wands, 8 U.S.P.Q.2d 1400 (Fed. Cir. 1988), wherein the court overturned an Examiner's finding of lack of enablement on the basis that screening is an expected experiment in the biotechnology art.

Napoli

Napoli attempted to overexpress chalcone synthase (CHS) in pigmented petunia petals by introducing a chimeric petunia CHS gene. The introduction resulted in an unexpected block in anthocyanin biosynthesis.

However, Applicant submits that the biosynthetic routes leading to flavonoids represented by anthocyanin involve complicated multi-step pathways. Thus, the overexpression of CHS alone by transgenic methods is not always directly correlated to the deepening of the petunia petals. Therefore, Applicant submits

that the failures of Napoli are not applicable to the present claims.

Carvalho

Carvalho discloses that expression of the resistant gene glucanase in transgenic plants and chitinase in plants, while they observed a decline in expression with the development of the plants in the former case and co-suppression to expression of the gene in each organ at each development stage.

However, Carvalho acknowledges a certain level of expression of the gene of interest, even though there may exist some suppression of the introduced gene. Carvalho obtains expression and thus achieves a positive transformant. Accordingly, Carvalho fails to support an argument for unpredictability.

Ejdeback

Ejdeback discloses a difference in codon usage between *E. coli* and plants. However, codon usage in microorganisms such as *E. coli* are known to one of ordinary skill in the art. One of ordinary skill in the art, given SEQ ID NO. 1, 2, 3 and 4 would be able to overcome this problem without undue experimentation to obtain the expression of the gene of interest.

Mehta

Mehta relates to the expression of human Interleukin-5 using *E. coli*. This is an example of expression of a mammalian gene in bacteria. On the other hand, the present invention comprises expression of a plant gene in a plant. Thus, Mehta is irrelevant to the present invention.

For the above reasons, the references cited by the Examiner fail to support his position that expression of foreign genes in transgenic plants is so unpredictable as to preclude patentability of the present claims.

Enablement is not precluded by the necessity for some experimentation such as routine screening, especially when an appropriate screening assay is described in the specification, In re Wands, 8 U.S.P.Q.2d 1400 (Fed. Cir. 1988). Thus, although the expression of foreign genes in transgenic plants may be unpredictable in one specific plant, those of ordinary skill in the art are aware of this and are prepared to conduct experiments necessary to identify transgenic plants that express aldehyde oxidase according to the invention. Also, the specification provides guidance sufficient to enable such screening. In particular, at page 7, line 23 to page 8, line 15, of the specification, an assay for aldehyde oxidase activity is described. Thus, one of ordinary skill in the art is prepared to create a number of transformants and then screen those

transformants for those with positive aldehyde oxidase activity.

Thus, it is evident that the present specification is enabling for the rejected claims. Accordingly, the Examiner is requested to withdraw this rejection.

Issues Under 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-16 under 35 U.S.C. § 103(a) as being obvious over Liu et al., Proc. Natl. Acad. Sci. (USA) 1994. Vol. 91: 1888-1892 (hereinafter Liu et al.) in view of Felsted et al., The Journal of Biological Chemistry. 1973: Vol. 248: 2580-2587 (hereinafter Felsted), and, Berger and Kimmel, Guide to Molecular Cloning Techniques, Method of Enzymology, Associated Press. 1987 (hereinafter Berger and Kimmel). Applicants respectfully traverse.

Distinctions Between the Present Invention and Liu et al.

Liu et al. discloses osmotin expression in potato and tobacco plants and fungal infection assays for potato and tobacco plants.

The reference infers the expression merely by the disease response and provides no explicit description of the inactivation of the transgene. In addition, and more importantly, Liu et al. provides no disclosure with respect to an aldehyde oxidase as defined by the sequences recited in claims.

Distinctions Between the Present Invention and Felsted

Felsted discloses the purification of aldehyde oxidase from rabbit and hog liver, however, Felsted fails to suggest or disclose an aldehyde oxidase according to the present invention as defined by the specific sequences.

Distinctions Between the Present Invention and Berger and Kimmel

Berger and Kimmel fail to suggest or disclose the gene according to the present invention as defined by the sequences recited in the present claims.

The Examiner has stated that all elements of Applicant's invention with respect to the specified claims are fully envisioned by the cited references. However, as decided in In re Deuel, 34 U.S.P.Q.2d 1552 (Fed. Cir. 1995), the combination of a reference teaching a method of gene cloning with a reference teaching a partial amino acid sequence of a protein, does not render DNA or cDNA molecules encoding for the protein *prima facie* obvious. The Examiner cites Felsted as disclosing the purification of a mammalian aldehyde oxidase protein. However, a review of Felsted reveals that there is no disclosure of a partial amino acid sequence. In fact, Felsted lacks the disclosure of any amino acid sequence, much less one which might be coded for by the presently claimed gene. Thus, under Deuel the present claims are non-obvious.

Applicant also relies on the holding of the court in In re

Bell, 26 U.S.P.Q.2d 1529 (Fed. Cir. 1993). The holding in Bell provides for the situation wherein a cloned DNA invention cannot be considered obvious due to the method of its making.

The PTO's focus on Bell's method is misplaced. Bell does not claim a method. Bell claims compositions, and the issue is the obviousness of the claimed compositions, not of the method by which they are made [citations omitted].

Bell, Id. at 1532

In view of the above remarks, it is evident that none of the prior art references cited by the Examiner provides either a suggestion or disclosure with respect to the presently claimed subject matter. Accordingly, each of the prior art references fails to render the present invention obvious. Accordingly, the Examiner is respectfully requested to withdraw all rejections. Applicant earnestly solicits the issuance of a Notice of Allowability.


Pursuant to the provisions of 37 C.F.R. § 1.17 AND 1.136(a), Applicants hereby petition for an extension of three (3) months to September 17, 1998 for the period in which to file a response to the outstanding Office Action. The required fee of \$950.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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